CORROSION RATING SYSTEM

Adopted by:
The US Army Tank-automotive &
Armaments Command (TACOM)

Introduction

The pictures contained within this document represent corrosive attack that may be present on vehicle and weapon system components. Although every effort has been made to accurately depict the various stages of corrosion, not all stages for all types of materials are represented by the enclosed pictures. These pictures are intended to be used as a guideline during inspections, not to depict all forms and stages of corrosion. The overall rating given to a component should be based upon the narrative description of each stage below.

This document is meant to be used only to monitor corrosion occurring on metallic components and to accurately report the severity of corrosion on that component. No effort is made by this document to determine what constitutes a corrosion failure. This should be done on a system by system or component by component basis by the program management office responsible for that system.

Stages of Corrosion

The different stages of corrosion are described below. These are also highlighted in several of the pictures contained within this document. These figures are for informational purposes only and are not intended to be all-inclusive. The severity of corrosion should be determined by the narrative for the five (5) stages of corrosion listed below.

Stage 0 – No visible signs of corrosion or corrosive attack. No presence of white, red or black corrosion products. No presence of paint film blistering indicating corrosive attack. Discoloration of a coating system, other than caused by corrosion, is permissible.

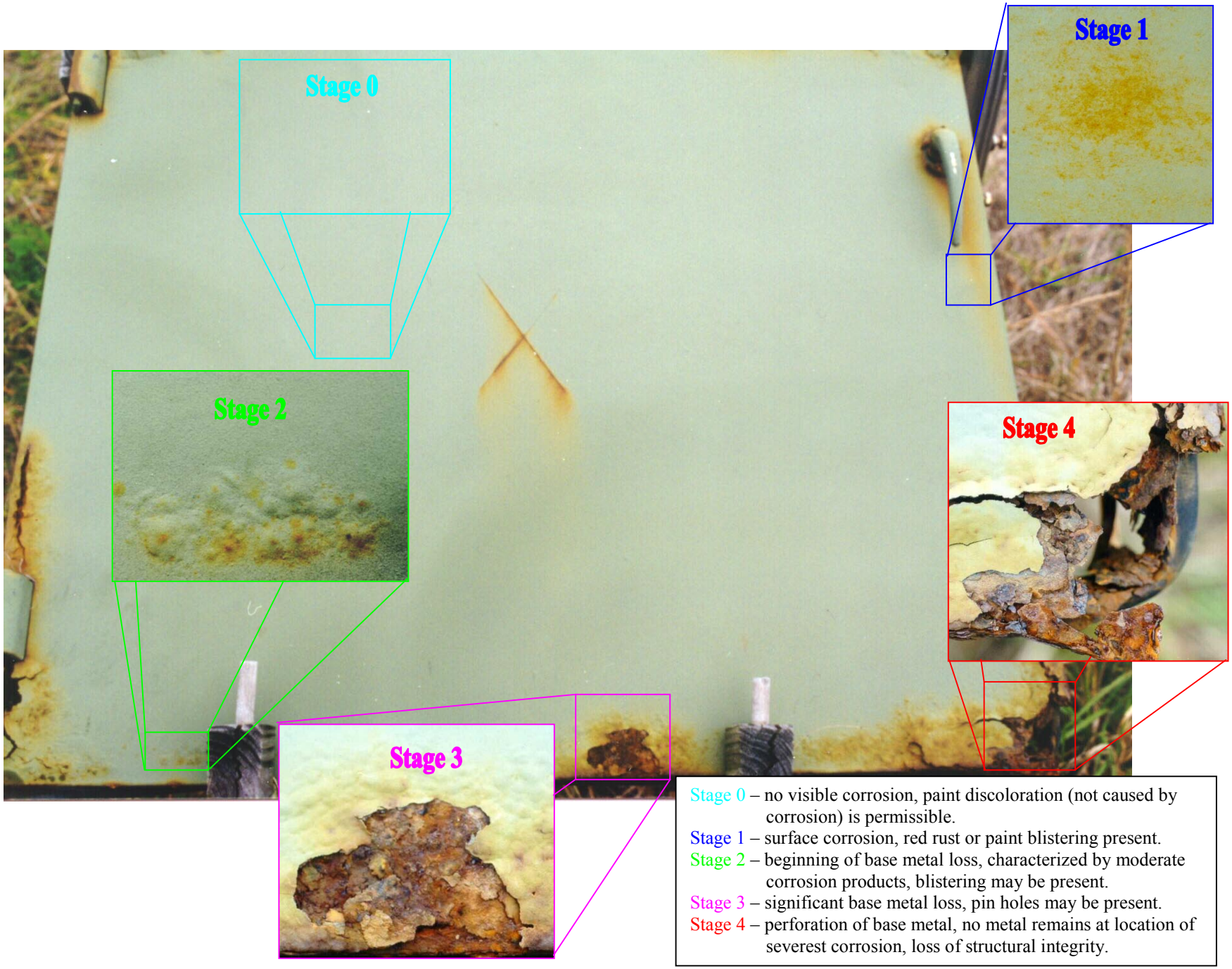
Stage 1 – General surface corrosion is present. White, red and/or black corrosion products are present on the surface of the component being evaluated, but no significant attack is present. Minor blistering of the coating may have also occurred.

Stage 2 – Heavy corrosion products are present on the surface of the component. This is the beginning of base metal loss, however, no significant loss has yet occurred. Moderate white, red and/or black corrosion products are present on the component surface. Severe blistering of the paint may have also occurred.

Stage 3 – Corrosive attack has resulted in significant base metal loss. Reduction in the cross-section thickness of the component has occurred. Voluminous white, red and/or black corrosion products are present on the component. The structural integrity of the component may or may not be compromised. Pinholes, which may or may not penetrate through the base metal, may have developed.

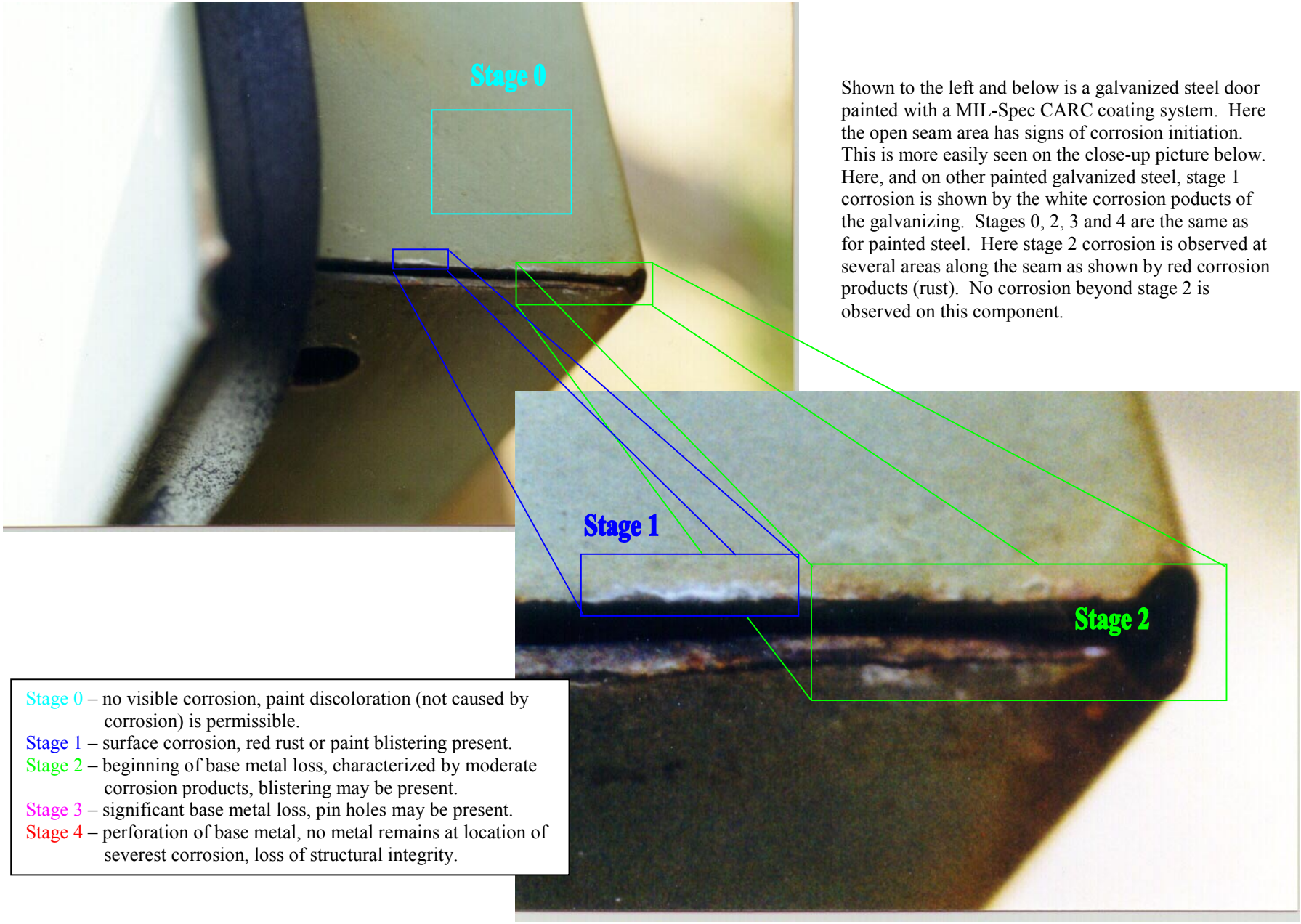
Stage 4 – Perforation of the base metal has occurred. No metal remains at the point of severest corrosive attack. The component has lost structural integrity.

Painted Steel



Stage 0 – no visible corrosion, paint discoloration (not caused by corrosion) is permissible.
Stage 1 – surface corrosion, red rust or paint blistering present.
Stage 2 – beginning of base metal loss, characterized by moderate corrosion products, blistering may be present.
Stage 3 – significant base metal loss, pin holes may be present.
Stage 4 – perforation of base metal, no metal remains at location of severest corrosion, loss of structural integrity.

Painted Galvanized Steel



Shown to the left and below is a galvanized steel door painted with a MIL-Spec CARC coating system. Here the open seam area has signs of corrosion initiation. This is more easily seen on the close-up picture below. Here, and on other painted galvanized steel, stage 1 corrosion is shown by the white corrosion poducts of the galvanizing. Stages 0, 2, 3 and 4 are the same as for painted steel. Here stage 2 corrosion is observed at several areas along the seam as shown by red corrosion products (rust). No corrosion beyond stage 2 is observed on this component.

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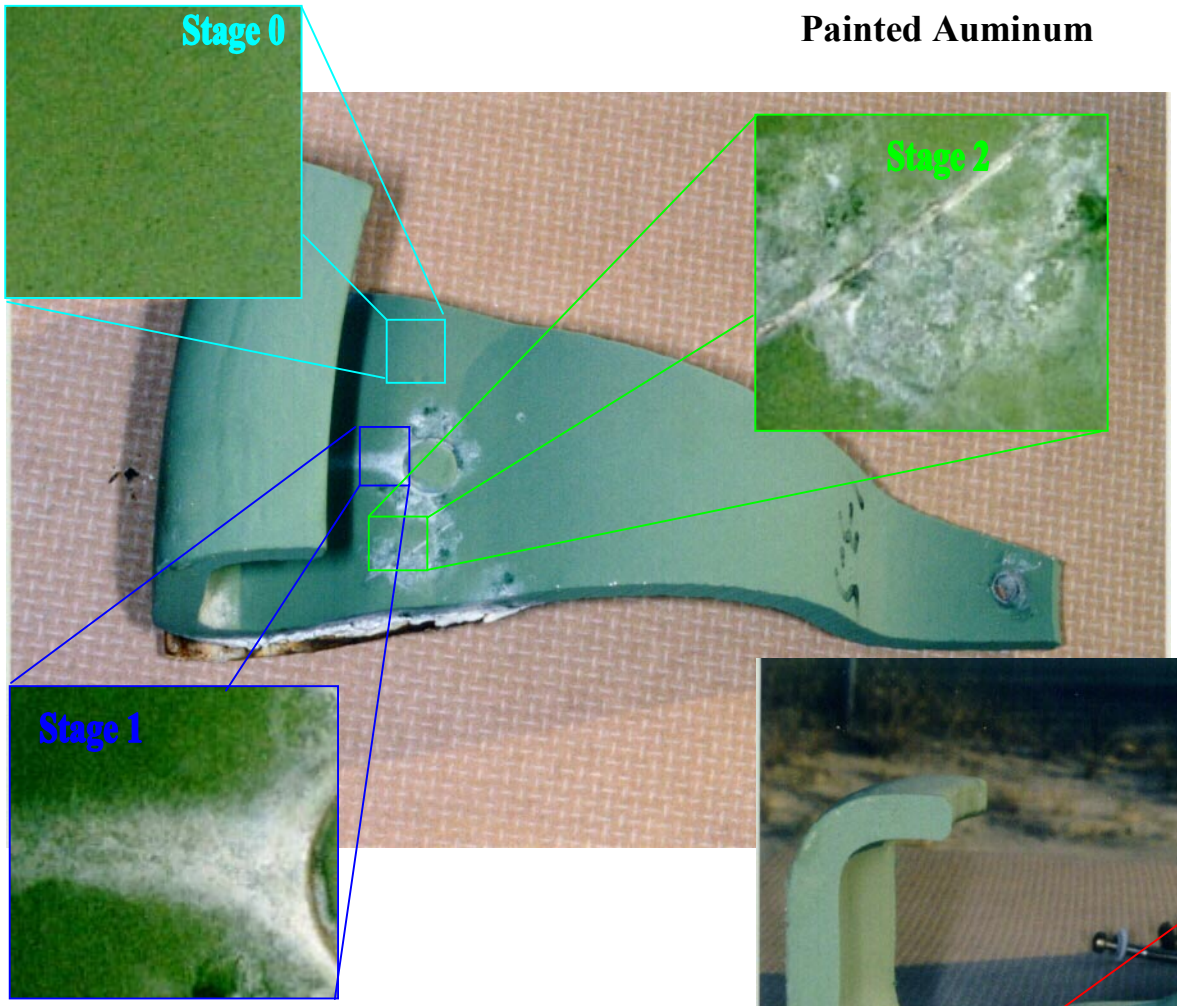
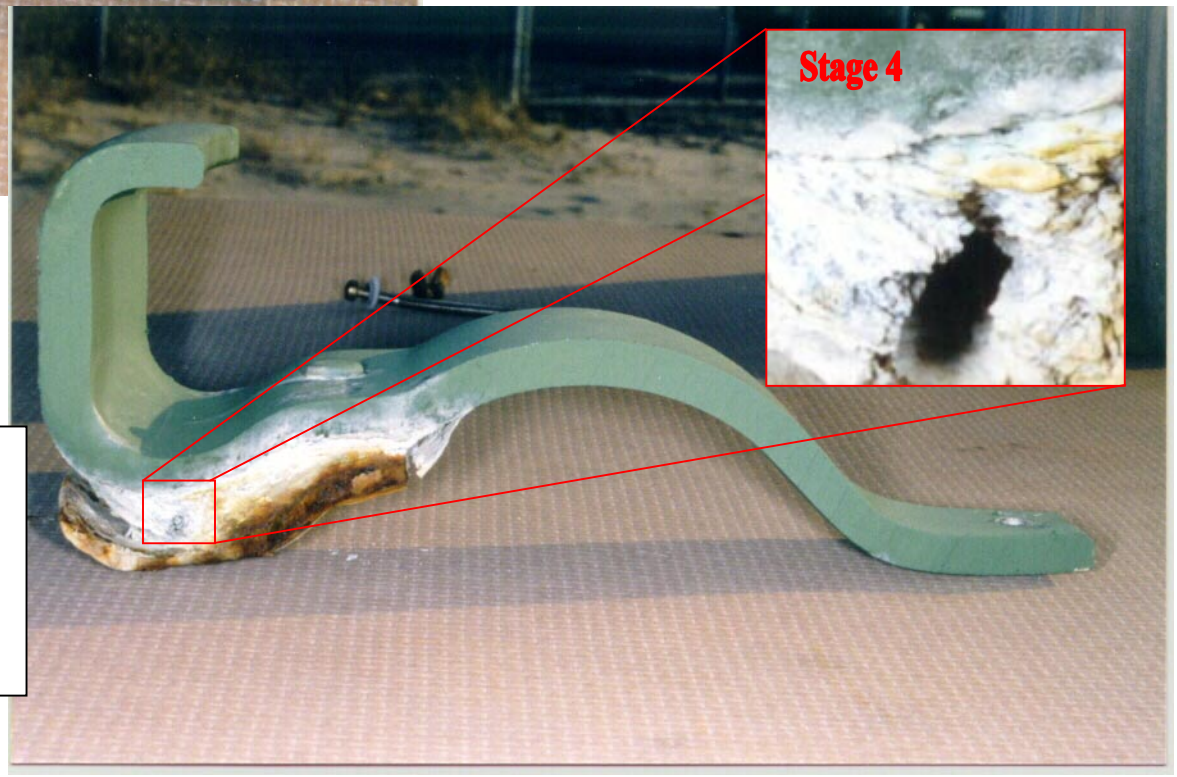
Painted Auminum



Shown to the left and below is a section of a Bradley aluminum road wheel. Various stages of corrosion are present on this component. The top view, shown to the left, has stages 0, 1 and 2 corrosion present. Stage 1 is shown by the white corrosion product around the center mounted rivet. Stage 2 is shown by the severe blistering of the coating and white corrosion products in the areas surrounding the rivet.

The side view, shown below, has stage 4 corrosion present. Here galvanic corrosion has occurred as a result of a steel plate being attached to the aluminum road wheel. The corrosion in this area has caused severe metal loss and corrosive attack in all areas directly connected to the aluminum wheel and complete base metal loss at one location. The red corrosion product (rust) is the general corrosion of the steel plate attached to the wheel and is not covered on this rating scale (see painted steel).



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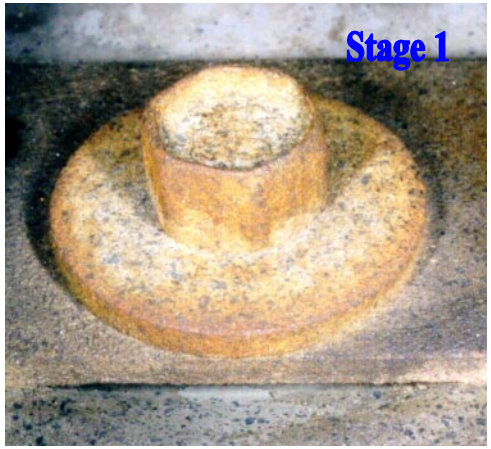
Small Steel Components



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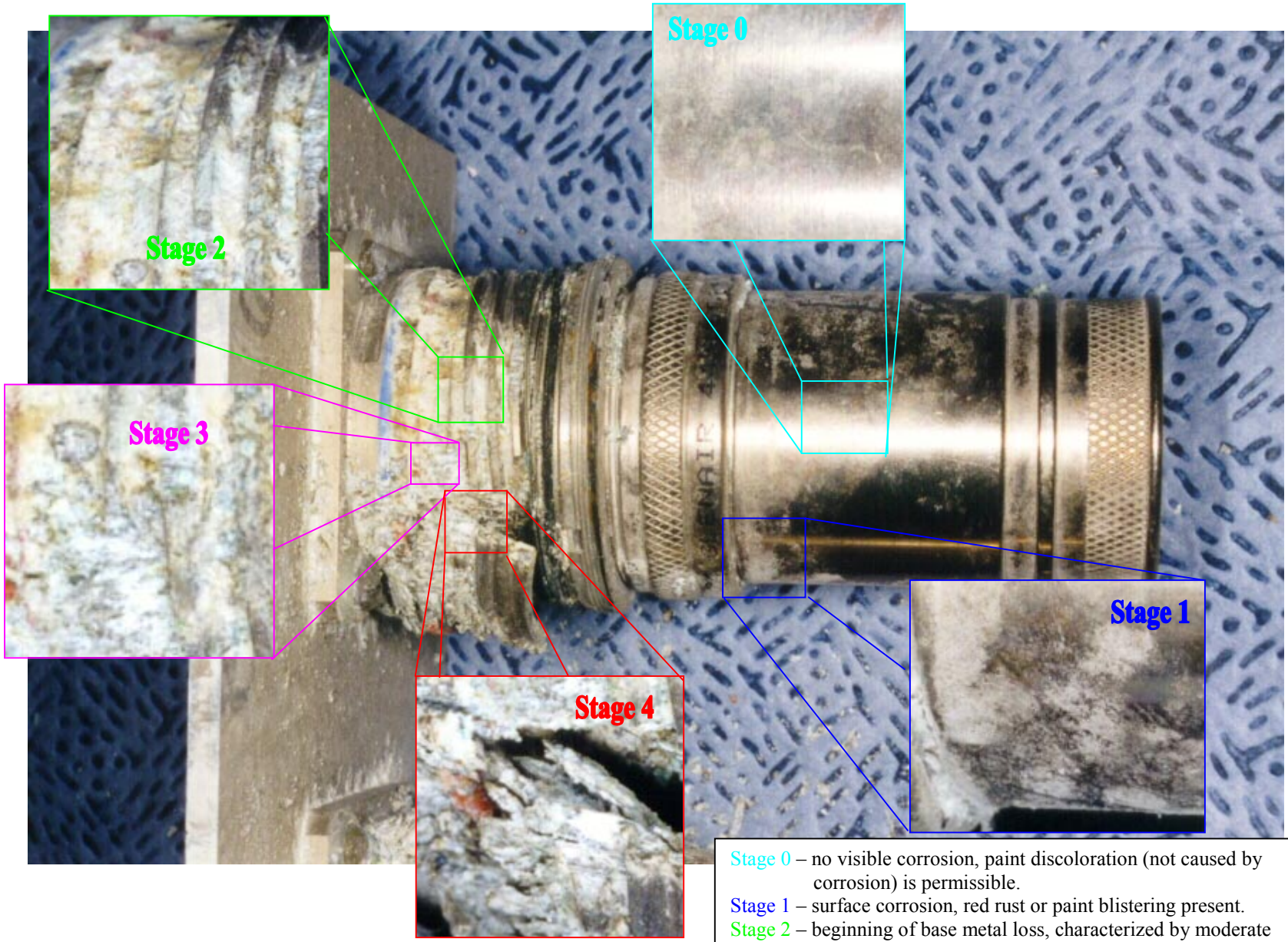
Small Aluminum Components



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Stage 4 – perforation of base metal, no metal remains at location of severest corrosion, loss of structural integrity.

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